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Four new *Humicola* species from soil in China

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Abstract — *Humicola chinensis*, *H. irregularis*, *H. pyriformoides*, and *H. tibetensis* spp. nov. from soil in China, are described, illustrated, and compared morphologically with similar species. The type specimens (dried cultures) and living cultures are deposited in the Herbarium of Shandong Agricultural University: Plant Pathology (HSAUP).

Key words — aleuriospores, anamorphic fungi, hyphomycetes, taxonomy

Introduction

Humicola was established by Traaen (1914) for two species of fungi with hyaline hyphae, *Humicola fuscoatra* Traaen (type species) and *H. grisea* Traaen. Later, more species were included, although those with pigmented hyphae did not fit within Traaen's original circumscription. Fassatiová (1967) emended the diagnosis of this genus and constructed a key for the determination of *Humicola* species. She pointed out that according to the taxonomic opinions of Hughes (1953) and Subramanian (1962) hyphal color was not a decisive feature and that only fungi with the definitely expressed character of forming aleuriospores could be included in the genus. De Bertoldi (1976) subsequently concluded that aleuriospore size was the most effective and stable diagnostic morphological character in *Humicola*.

During an investigation of the soil dematiaceous hyphomycetes in China, four fungi were obtained that grew on potato dextrose agar (PDA) and possessed

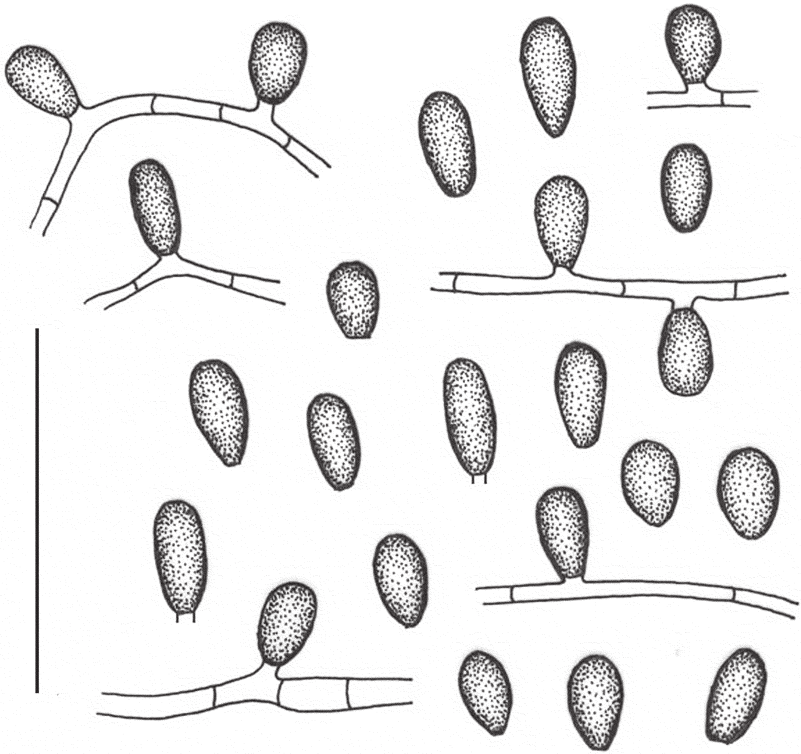

Fig. 1. *Humicola chinensis* (ex holotype HSAUP $II_{04}6065$).
Conidia and conidiophores. Scale bar = 25 μm.

the typical *Humicola* characters. They did not match with other known species in this genus and are therefore proposed as new species.

Humicola chinensis Y.L. Jiang & T.Y. Zhang, **sp. nov.** Fig. 1

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Differs from *Humicola piriformis* and *H. pyriformoides* by its yellowish colony color and its narrower, obovoid to oval conidia.

Type: China, Hubei Province, Enshi, from soil of a lotus pond, 18 Oct. 2004, Y.L. Jiang (**Holotype**, HSAUP $II_{04}6065$).

Etymology: in reference to the country where the specimen was isolated.

Colonies on PDA effuse, pale greyish yellow, reverse yellowish brown, reaching 4–5 cm in diameter in 2 weeks at 25 °C. Mycelium superficial and immersed; hyphae hyaline, branched, septate, smooth, 1–3 μm wide. Conidiophores

arise on long aerial hyphae, lateral, unbranched, 0.5–4 µm long. Conidia formed singly either directly on the sides of vegetative hyphae or on short lateral conidiophores, smooth, unicellular, obovoid or sometimes oval, rounded at the distal end, truncate at the base, often with a small portion of the conidiogenous cell attached, pale to dark brown, 4.5–9 × 3–4.5 (commonly 6.3 × 3.5) µm, they often become detached. No intercalary chlamydospores or enteroblastic phialidic conidia present.

Comments: In conidial morphology *Humicola chinensis* resembles *H. piriformis* De Bert. and *H. pyriformoides* (see below), but *H. piriformis* differs by its brown-black colony color, its globose or pyriform conidia (7–7.2 × 7.1–7.5 µm), and its enteroblastic phialidic conidia and intercalary chlamydospores (De Bertoldi 1976), and *H. pyriformoides* differs by its pale grey colony color and mostly spherical or subspherical conidia (4–13 µm diam.).

Humicola irregularis H.F. Wang & T.Y. Zhang, sp. nov. Fig. 2

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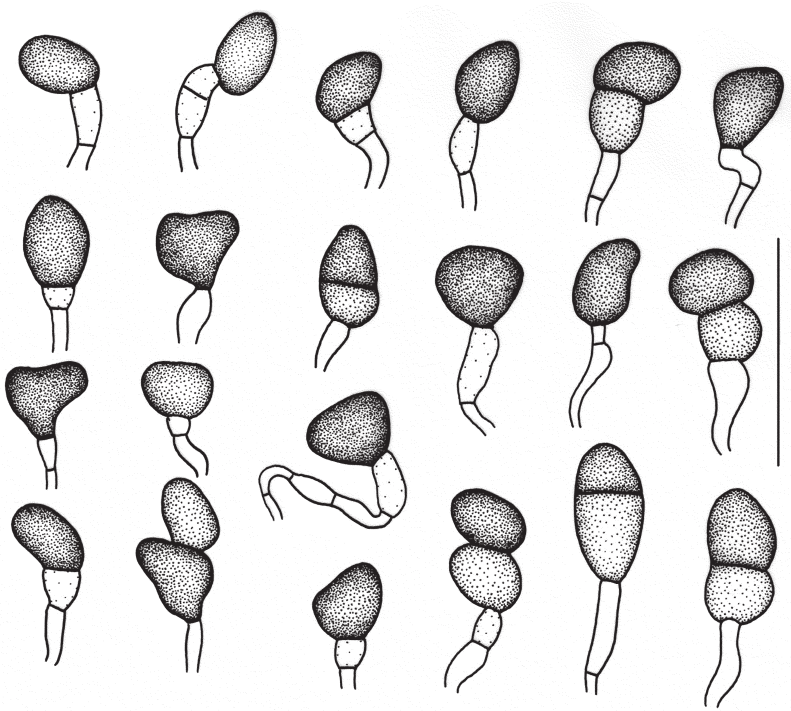

Fig. 2. *Humicola irregularis* (ex holotype HSAUP II_{06}5173). Conidia and conidiophores. Scale bar = 25 µm.

Differs from all other *Humicola* species by its irregularly shaped 1–3 celled conidia.

Type: China, Qinghai Province, Huzhu County, from a mountain soil, H.F. Wang (**Holotype**, HSAUP II_{06}5173 (dried culture); **isotype**, HMAS 196247).

Etymology: in reference to the irregular shape of the conidia.

Colonies on PDA effuse, floccose or hairy, dark grey to black, reverse black, reaching 5–6 cm in diameter in 2 weeks at 25 °C. Mycelium mostly superficial; hyphae hyaline, branched, septate, smooth, 1.3–2.5 µm wide. Conidiophores micronematous, unbranched, hyaline, septate, smooth, straight or flexuous, 0.5–3 µm wide, up to 34.5 µm long. Conidiogenous cells monoblastic, terminal or lateral, cylindrical or slightly swollen. Conidia 1–3 (commonly 1–2) celled, irregular in shape: cuneiform, broadly obovoid or other shapes, brown to dark brown, smooth, unicellular 3.5–11 × 3–6 µm (commonly 4.5 × 4 µm), bicellular 9.5–14 × 6.5–7.5 µm. No intercalary chlamydospores or enteroblastic phialidic conidia present.

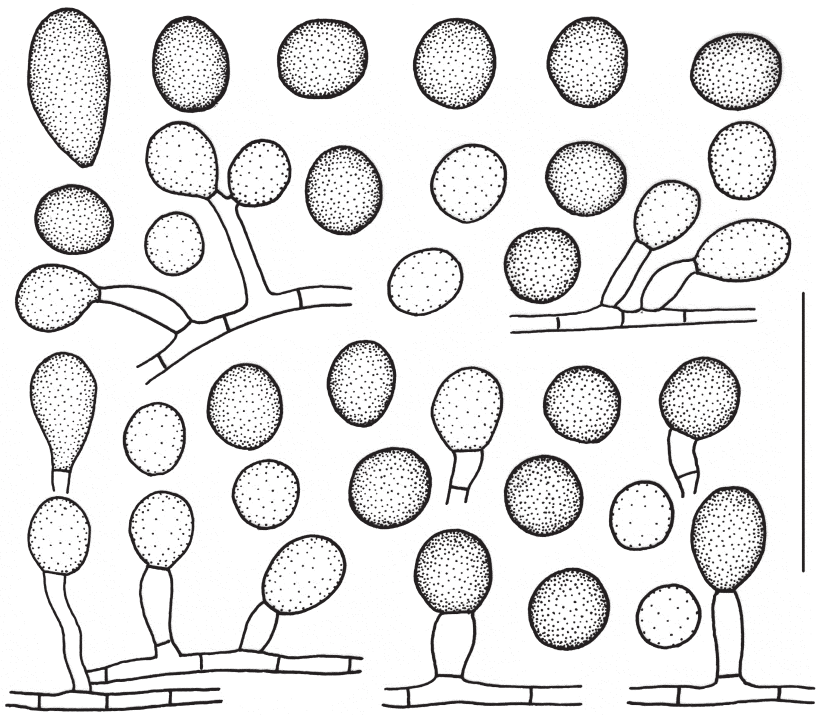

Fig. 3. *Humicola pyriformoides* (ex holotype HSAUP II_{04}2811). Conidia and conidiophores. Scale bar = 25 µm.

Humicola pyriformoides J.J. Xu & T.Y. Zhang, **sp. nov.** Fig. 3

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Differs from *Humicola piriformis* by its paler colony color and wider conidia.

Type: China, Fujian Province, Pingtan, from soil of a rice field, J.J. Xu (**Holotype**, HSAUP $II_{04}2811$).

Etymology: in reference to the similarity of the conidia to those of *Humicola piriformis*.

Colonies on PDA effuse, velvety or cottony, at first white, gradually becoming pale grey, reverse pale brown, reaching a diameter of 2–5 cm in 2 weeks at 25 °C. Mycelium superficial and immersed; hyphae hyaline to subhyaline, branched, septate, smooth, 1–3.5 µm wide, sometimes forming simple mycelial ropes. Conidiogenous cells monoblastic, terminal or lateral, hyaline to pale brown, non-septate, smooth, 1–21 × 3–4.5 µm. Conidia solitary, smooth, unicellular, pale brown to brown, mostly spherical or subspherical, 4–13 µm in diameter, or sometimes pyriform, 4–13 × 3–7 µm. No intercalary chlamydospores or enteroblastic phialidic conidia present.

Comments: In conidial morphology, *Humicola pyriformoides* is close to *H. piriformis*, which differs by its dark brown to black colored colonies, its narrower conidia (7–7.2 × 7.1–7.5 µm), and its production of small enteroblastic phialidic conidia and intercalary chlamydospores (De Bertoldi 1976).

Humicola tibetensis Y.H. Geng & T.Y. Zhang, **sp. nov.** Fig. 4

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Differs from *Humicola grisea* by its smaller conidia.

Type: China, Tibet: Changdu County, altitude 3600 m, from a broadleaf-conifer mixed forest soil, 1 Jul. 2006, Y.H. Geng (**Holotype**, HSAUP $II_{06}1202$ (dried culture); **isotype**, HMAS 196250).

Etymology: in reference to the region where the specimen was collected.

Colonies on PDA effuse, cottony, first white then gradually becoming pale brown to greyish brown, reverse slightly paler, reaching a diameter of 2–5 cm in 2 weeks at 25 °C. Mycelium superficial and immersed; hyphae hyaline to subhyaline, branched, septate, smooth, 1–1.5 µm wide. Conidiophores differentiation inconspicuous. Conidia acrogenous or pleurogenous, solitary, broadly obovoid, spherical to subspherical, pale brown, thick-walled, smooth, 6.5–13.5 × 6–11.5 µm. Intercalary chlamydospores ellipsoidal to broadly ellipsoidal, pale brown, 6.5–10 × 6.5–7 µm. Enteroblastic phialidic conidia are produced by a simple, hyaline and smooth phialide, unicellular, spherical or ellipsoidal, pale brown to brown, smooth, rarely catenate, 3–5 µm in diameter.

Comments: In producing typical aleuriospores, intercalary chlamydospores and phialospores and in its conidial morphology, *H. tibetensis* resembles

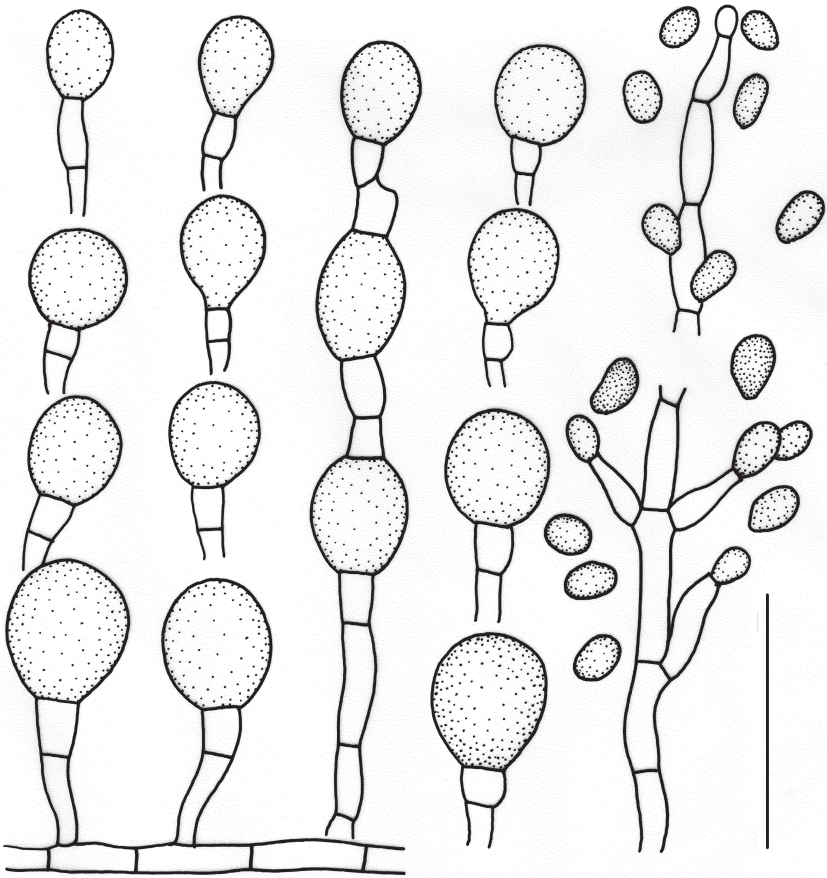

Fig. 4. *Humicola tibetensis* (ex holotype HSAUP $II_{06}1202$).
Conidia, conidiophores, phialides, and phialospores. Scale bar = 25 μm.

H. grisea, which differs by its larger conidia (12–17 μm diam.) and its catenate phialospores (Traaen 1914).

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Literature cited

Agarwal SC. 1982. A new species of *Humicola* from Indian alkaline soils. J. Mycol. Plant Pathol. 12(2): 222–223.

De Bertoldi M. 1976. New species of *Humicola*. An approach to genetic and biochemical classification. Can. J. Bot. 54(24): 2755–2765. http://dx.doi.org/10.1139/b76-296

Ellis MB. 1971. Dematiaceous hyphomycetes. Commonwealth Mycological Institute, Kew, Surrey, England. 608 p.

Fassatiová O. 1967. Notes on the genus *Humicola* Traaen. II. Česká Mykologie 21(2): 78–89.

Hughes SJ. 1953. Conidiophores, conidia and classification. Can. J. Bot. 31: 577–659. http://dx.doi.org/10.1139/b53-046

Roxon JE, Jong SC. 1974. A new pleomorphic species of *Humicola* from Saskatchewan soil. Can. J. Bot. 52: 517–520. http://dx.doi.org/10.1139/b74-066

Subramanian CV. 1962. The classification of the hyphomycetes. Bull. Bot. Surv. India 4: 249–259.

Traaen EA. 1914. Untersuchungen über die Bodenpilze aus Norwegen. Nyt. Mag. Naturvid. 32: 20–121.